(19) Japanese Patent Office

(11) Unexamined Patent Application (Kokai)
Publication No. S53-91054
(43) Disclosure Date: August 10, 1978

(51) Int. Cl.[2]	ID No.	(52) Japanese Classification	Internal Office No.
B22F 9/00		12C 243	6694-39
H01F 1/06		62 B 5	7303-57

Number of Inventions: 1
Request for Examination: not yet submitted
Total number of pages in the original: 2

(54) METHOD OF MANUFACTURING METALLIC COBALT POWDER

(21) Application No. S52-6044
(22) Filing Date: January 21, 1977

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PATENT SPECIFICATION

1. Title of the Invention: Method of Manufacturing Metallic Cobalt Powder

2. Claims:

(1) A method of manufacturing a super-fine metallic cobalt powder by subjecting

cobalt carboxylate to thermal disintegration in an organic solvent of high-boiling point.

(2) The method of Claim 1, wherein thermal decomposition is carried out at a temperature within the range of 200 to 300°C.

3. Detailed Description of the Invention

The present invention relates to a method of manufacturing a metallic cobalt powder with small diameters of powder grains.

Metallic cobalt powder is obtained with crystalline anisotropicity, develops coercive force, and possesses high magnetic capacity. It is also more resistant to rusting than iron powder. Therefore, it is to a lesser degree subject to changes in magnetic characteristics and comprise and excellent magnetic material. Furthermore, the smaller the diameter of particles, the higher the coercive force, and therefore it is desirable to produce the metallic cobalt powder with as small particles as possible.

It has been known heretofore to obtain a metallic cobalt powder by baking cobalt oxalate. In this process, however, the cobalt powder is sintered under the effect of decarboxylation, thus producing non-uniform and coarse grains.

The present invention relates to a method of manufacturing a super-fine metallic cobalt powder by subjecting cobalt carboxylate to thermal disintegration in an organic solvent of high-boiling point.

A cobalt carboxylate suitable for the method of the present invention may comprise cobalt (I) salt or cobalt (II) salt. A carboxylic acid may comprise an oxalic acid, acetic acid, propionic acid, succinic acid, malic acid, etc., but acetic acid is most preferable in view of its low cost.

For practical purposes, it is recommended that the organic solvents with high boiling point have boiling points exceeding 200°C, although a boiling point as low as 150°C is also allowable. When a high-boiling-point alcohol is used as the aforementioned organic solvent, the process of thermal decomposition of a

cobalt salt can be accelerated. Alcohols suitable for this purpose may comprise alkylene glycol, polyalkylene glycol, vegetable oils, or the like. The most preferable is polyalkylene glycol. The organic high-boiling-point medium should be used in such an amount relative to the cobalt carboxylate that exceeds the one required for dissolving the cobalt salt at 100°C. Otherwise the cobalt salt will not dissolve, and it would be difficult to obtain super-fine powder grains.

Heating should be carried out at a temperature exceeding 200°C, preferably within the range of 200 to 270°C. In order to suppress oxidation that normally accompanies formation of metallic cobalt, the process should be conducted in a nitrogenous atmosphere. If necessary, however, the process can be carried out under conventional atmospheric conditions. When heating is performed at a temperature exceeding the boiling point of the organic medium used in the process, it is recommended to carry out the process in an autoclave. Heating is carried out till complete decomposition of the cobalt salt with precipitation of the metallic powder.

A metallic cobalt powder obtained by the above-described method has about 10 times smaller diameter of particles and three times greater coercive force as compared to a powder produced by baking cobalt oxalate. In view of its fineness and uniformity of magnetic properties, the cobalt powder produced by the above method is suitable for use in the production of magnetic recording media.

Practical Example 1

173 g of an anhydrous cobalt (I) acetate were added to 1300 g of polyethylene glycol (average molecular weight of about 400), and the components were stirred for 3 hours with heating in nitrogenous atmosphere at 200°C. The precipitated metallic cobalt powder was filtered out, washed with water, and dried. As a result, about 400 g of metallic cobalt powder were obtained. The obtained powder is characterized by extremely uniform grains with an average diameter of about 0.1 μm, a coercive force of 2000 oersted, and magnetism of about 138 emu/g.

Thus it has been shown that a metallic cobalt powder with super-fine and

uniform grains can be easily and reliably produced by the method of the present invention.

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